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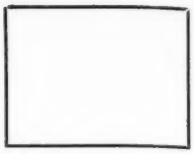

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ALTITUDE: ITS ROLE IN THE LIFE OF MAN IN THE HIGH PERUVIAN SIERRA

C. LANGDON WHITE
Stanford University

Scientists are well aware that man ranks among the most adaptable of the earth's organic occupants—that not a single one of the some dozen climates is absolutely intolerable to him. Only lack of food will exclude him from even the most inhospitable areas. Most scientists also are aware that the *Quechua* and *Aymará* Indians are at home in their Andean highlands and that a civilization evolved there. However, unless they have spent considerable time in the Peruvian or Bolivian *sierra,* they do not know the problems involved and do not appreciate the full accomplishments of the aborigines.

The Central Andes are unique among the world's high mountain environments in having cradled an extremely high civilization—the Incan. Moreover, this civilization evolved at altitudes varying from 10,000 to 16,000 feet, where the natural environmental conditions are inhospitable, hard and unyielding. Hence, one can hardly understand how so high a civilization could have been sustained or how it could have prospered there since we know that the mere maintenance of life in such high altitudes is a terrific struggle. Such a *milieu* tends to repel rather than invite population. To have remained there definitely challenged their ingenuity.

One wonders why the Indians remained here once they realized the restrictive conditions of their environment. Why did they not migrate into the more hospitable valleys. This is an unanswered question!

"The why of man's distribution over the earth is one of the most complicated problems in natural science and the solution of it is the chief problem of the modern geographer."[1]

[1] Isaiah Bowman, "The Country of the Shepherds," *Geographical Review,* I (1916), 419.

Possibly the principal reasons why they failed to migrate were that the Indians did not like the hot, humid climate of the *montaña,* and that they found the struggle against the rain forest too one-sided—with themselves invariably on the losing side. They preferred and throve in the drier, more bracing air of the high intermontane valleys and plateaus; there they could carry on agriculture much more easily under irrigation. It should be realized, however, that when we speak of the highlands as the place of birth and

FIG. 1. **The Central Andes.** It is here that most of the medical and physiological research on the "mountain men" has been and is being prosecuted. Research laboratories are maintained in Lima (512 feet above sea level), in Huancayo (10,700 feet) and in Morococha (14,800 feet). (Drawn by Doris Johnson)

the home of the Indians, we refer not to the highest highlands, for there occurs restriction almost as definite as any to be found elsewhere in the world. It should be realized further that to date anthropologists are almost unanimous in their belief that man came into the Western Hemisphere by way of the Bering Sea or the Aleutian Islands.

The Central Andes are undoubtedly a superior place to study the effect of altitude upon man. Such a study is enriched by the presence of an indigenous population having interesting physiological

processes and is facilitated by the region's proximity to Lima and by excellent transportation facilities, highway, railway and airway, which enables one to make the trip quickly (Fig. 1). Study of the Indians in relation to their habitat has been carried on and is now being carried on by a number of physiologists and doctors of medicine. Other scientists, however, have largely ignored the problem or have given it only superficial attention. Yet it is an interesting and significant study in human ecology, for what use is ultimately to be made of the *sierra* must be largely a matter of employing the Indian and *mestizo* to best advantage.

It is the purpose of this paper to emphasize primarily the geographical aspects of the problem—to *synthesize* the painstaking research of others in an effort to see the forest rather than the trees.

PHYSICAL ENVIRONMENT

Before going into the matter of acclimatization, however, let us try to get the feel of the *sierra*. In few places in the world is terrain so intimately intermeshed with the life of the people as here; so it is in the light of the natural environment that one can appreciate best the true magnitude of the accomplishments of Incan Empire building and truly and sympathetically understand the Indian of the present day. The *sierra* comprises one of the three major regions of Peru (Fig. 2)—a region making up about 40 per cent of the total area of the nation. The Andes here consist of endless tumbled ranges and mountains with great intermontane valleys and plateaus. No word description, however vivid, and no photograph, however true, can give a clear concept of the overwhelming obstacles that had to be overcome to make this region habitable (Fig. 3). Here the gigantic mountain system of the Andes extends the whole length of the country, forming a lofty belt 200 to 250 miles wide.

The main climatic characteristics are the low precipitation (except on the northern and eastern sides of the mountains), a seasonal rhythm in the rainfall in the central and southern portions, a wide daily range of temperature, thin air and a high percentage of clear days. This last results in rapid heating by day and rapid cooling by night. In houses and in shade out-of-doors one becomes uncomfortably cold. After his trip to the *altiplano,* Lord Bryce asserted that he understood clearly *why* the Incas were sun worshippers.

The natural vegetation for the most part, in the cold, windswept

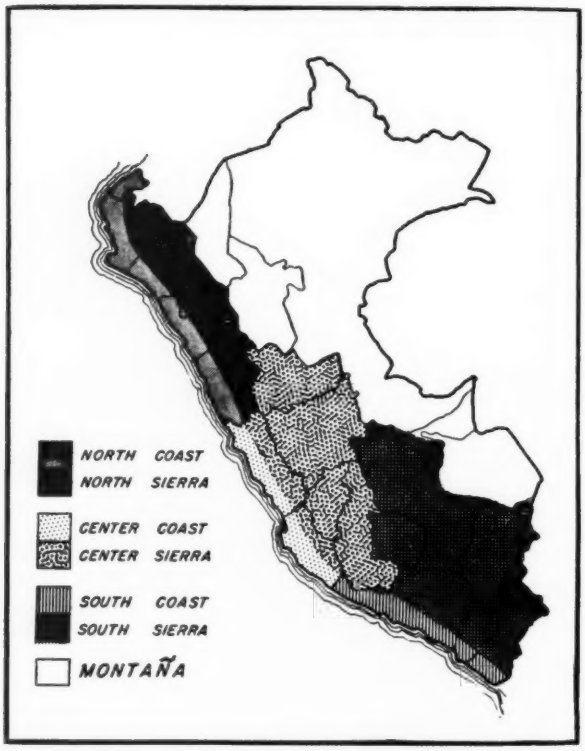

FIG. 2. **Peru is three Perus:** the *Sierra,* which comprises approximately 40 per cent of the country's area, ranks second in size, being surpassed only by the *Montaña.* The *Sierra, the Indian region,* is the most populous, most colorful and most interesting historically. (Institute of Inter-American Affairs)

highlands, consists of grasslands known as *puna.* It consists of low shrubs, mosses and bunch grass and is a response to the combination of wind, low temperature and inadequate water.

Theoretically, the terrain, climate and vegetation would appear to be fit only for producing and sustaining a backward, poverty-stricken people; yet it supported one of the world's outstanding civilizations. *Everything was inferior save man himself!*

The pre-Incas and the Incas made great contributions to civilization: they developed a truly scientific agriculture. To do this took intelligence and time—much of both (Fig. 4). This outstanding agriculture was developed, moreover, without the aid of the ox, horse or any other power than that of their own muscles.

These people also displayed great skill in the use of stone: they

built roads, bridges, aqueducts, canals, fortifications and temples.

How they cut the granite blocks weighing 20 to 300 tons, moved them over considerable distances, fashioned and put them together, we do not know.

THE INDIAN TODAY AND HIS ADAPTATION TO THE HIGHLAND REGION

It is in this kind of region that from one-half to two-thirds of Peru's total population (of which 80 per cent at least is Indian) now dwells—a region where the cold is relieved for only a few hours a day by the sun, where there are great extremes of temperatures from day to night and from sun to shade, where the air is thin, where the land is so cold and stony that it is difficult to grow crops and where it is hard to find fuel of any kind to cook with or keep warm by. Yet probably nowhere else in all the Americas is there so close a spiritual and physical adjustment between a people and their physical environment.

FIG. 3. The *milieu* of the Peruvian mountain Indians is a severe one. In the higher areas one is never—not even for a moment—unaware of the geographic environment. (Grace Line photo)

FIG. 4. **Spectacular Inca terrace**—garden at Cuyo-Cuyo (Puno), Peru. Nestling at more than 11,000 feet above sea level, the village is hemmed in by more than 150 terraces, which climb the mountain sides toward the sky. On these old terraces tuber crops are grown—potatoes, oca, añu and others. These terraces are hundreds, possibly thousands of years old. Here in Incan times was practiced some of the best conservation farming that the world has ever known. (Courtesy W. H. Hodge)

THE INDIAN'S CONSTITUTION: A RESPONSE TO ALTITUDE

The Indians[2] residing in the area under discussion are born and live all their lives in the *sierra,* and hence present favorable material for study. They are small in stature, averaging around 61 inches. They have barrel-like chests; the height of their chests is about the same as for whites but the breadth is about 10 per cent greater. The chest is out of proportion to stature; hence the Indians have been likened to "pouter pigeons." The faces of many, the most healthy, are plum colored. They have more red blood corpuscles than lowlanders—6,500,000 to 8,000,000 per cubic millimeter of blood at Morococha (altitude 14,800 feet) as against 5,000,000 to 5,500,000 at sea level. Moreover, their hearts are long and thick, beat slowly and perform 20 per cent more work than hearts of lowlanders. Their blood, too, is in greater volume (two quarts more), and contains more oxygen per unit than that of people at sea level. Their respiratory rate is slightly increased over that of lowlanders. They are acclimatized, acclimatization referring to persons whose systems can and do distribute the extra strain of altitude over the entire body and so prevent any part giving way before any other. Here is a climato-physiological variety of human being whose biological characteristics differ somewhat from those of people who dwell at or near sea-level.

For centuries and perhaps millenia, congenital and acquired acclimatization has enabled these Amerindians to occupy high areas under normal conditions at an oxygen pressure of 85 millimeters, rather than 150 millimeters at sea level. Seldom does the Indian get *soroche* or mountain sickness, for he is at home in his mountain habitat. He *can* get it, however, and occasionally *does* when he drives his animals into very high and unaccustomed altitudes. This he does only when his flocks find *the best forage at such heights.* That he is a true mountain man is indicated by the fact that he does not adjust well to sea level conditions—becoming predisposed to diseases of the lungs and what is known as "lowland sickness." When the mountain man goes to sea level, his heart gets smaller and the number of red cells is reduced. When he makes this journey, he does so not from choice but from economic necessity, for the highland is the place of his birth and his home. But the struggle for

[2] Not all the people here are Indians, even if they appear to be; many are *mestizos* or *cholos.* The Peruvian distinguishes them by their different clothing.

existence makes it imperative for him to go. The income of the mountain Indian is pitiably low—about 25 to 50 cents a day in our money. Possibly all of the approximately 100,000 Indians who go down to sea level each year for seasonal farm work on the sugar and cotton plantations return to the *sierra* during the year. *They never remain permanently on the coast.* In their actions they are like migratory birds. In the coastal region they have gained a reputation for being "unreliable." When the time comes to harvest their own crops in the highlands they "take off," regardless of how badly they are needed where they are. An Indian serving as a domestic in Lima returns suddenly to his highland home *without apparent reason.* But according to Dr. Carlos Monge, Director of the Institute of Andean Biology, the Indian is obeying an inner biological urge to return home.[3] More mountain Indians have been tempted to go west than to go east for work. This choice is definitely a matter of environment, for the dry, somewhat cool climate of the coast is greatly preferred to the hot, rainy, muggy climate of the *montaña.* Their forebears, the Incas, never settled deeply in the *montaña* (Fig. 5). They did make sporadic raids against border tribes and they built a chain of fortifications (Machu Picchu is probably the best example) to prevent these enemies from reaching Cuzco.

From the standpoint of human ecology, the acclimatization of the highland Indians is important because man's use of the region must necessarily depend upon them and the *cholos,* for together they comprise the only productive element for work. Furthermore, they are irreplaceable: farming, stock-rearing, mining, smelting (the physical work), road-building—these and other tasks are performed by them alone. Even in the carrying of burdens, hundreds compete with llamas, donkeys, mules, and in several cities and many towns, with trucks. The *cholo,* or mixed-blood, is a new ethnic type that is acquiring the original ancestral qualities, and the more Indian blood a given individual has when living in the Andes the better adjusted he is to this habitat. Biologically speaking, a white race no longer exists in Peru's higher elevations.[4] The last Peruvian census significantly points out that the percentage of pure whites and of pure Indians in the population is decreasing, whereas

[3] Carlos Monge, *Acclimatization in the Andes* (Baltimore: Johns Hopkins University Press, 1948).

[4] *Ibid.,* 38.

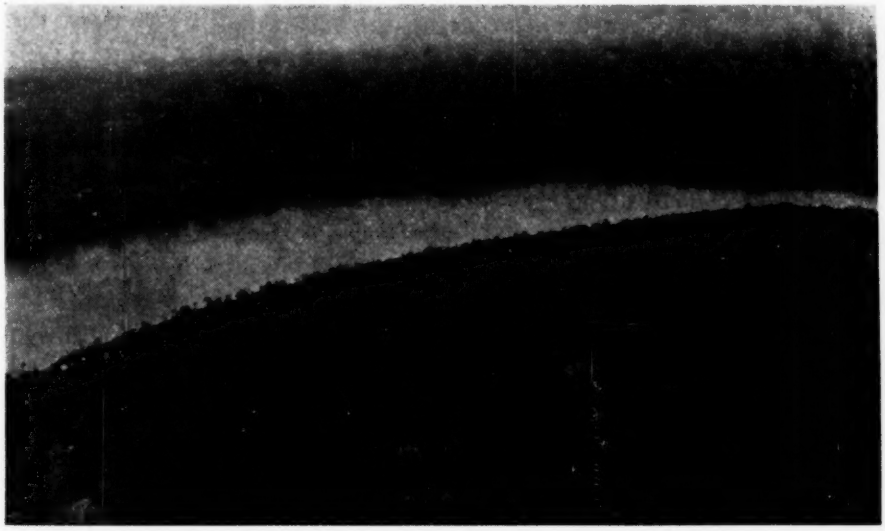

FIG. 5. **The montaña**—enormous region of *selva* and jungle on the east side of the Andes. Tho considered an *El Dorado* for more than 400 years, the white man has hardly made a dent in it: note his puny efforts at settlement along the river. His accomplishments are unimpressive even along the rivers and the principal highways; back from the streams, settlements are negligible. The montaña plays a minor role in the economic life of Peru. The Incas shunned the hot, humid, insect-ridden region, and for the most part their descendants do likewise, tho there is some internal migration from the *sierra* to the jungle. (Courtesy Servicio Aerofotográfico Nacional)

that of *mestizos* is increasing "at high speed." It is the Indian and *cholo* upon whom the successful development and use of the high country must depend.

HEALTH AND LIFE EXPECTANCY OF THE MOUNTAIN INDIAN

It is reliably estimated that the Indians who live and work under the most rigorous conditions of climate have a life expectancy of only 35 years—about half that of the average American. Eighty per cent of the people die from pulmonary diseases and 60 per cent have tuberculosis; possibly 50 per cent have syphilis. Whooping cough, however, is the most serious disease among infants and children. During an epidemic, half the children in some valleys may die within a few weeks—the virulence being 10 times that in the United States. From 20 to 33 per cent of all mountain children are believed to die before reaching their fifth year. Few mountain people survive a bad accident or a major illness. Superstition, including sorcerers, diviners, herb specialists and others, along with remote-

ness, poor transportation and biting poverty, conspire to deny the mountain man and his family proper medical service.

The White Man and High Altitude

The white man never has lived successfully in the high Andes. When Pizarro and his *conquistadores* invaded the *sierra* they were definitely affected by altitude. Some became sterile as did some of their domesticated animals. This was a major reason for moving the capital in 1639 from Jauja (13,000 feet) to Lima (almost at sea level). It is significant that at the great silver-mining city of Potosí (14,000 feet), a city that had a population of 100,000 natives and 20,000 Spaniards in the early 1600's, few white children were born and not a single one survived during the first 53 years of the city's existence. When finally one did live, its survival was regarded as a miracle. The Indians on the other hand went right on reproducing normally. It accordingly became the custom of Spanish mothers to go to the valleys at some distance from the city to give birth to their children and not to return until the babies were at least six months old. Some, but by no means all, pregnant white women—the wives of engineers, geologists, technicians, mechanics and other foreigners living at Cerro de Pasco, Morococha, Oroya and kindred mountain mining centers today go down to Lima to have their babies, arriving some weeks before and remaining for several weeks after birth. Even so, the death rate of such babies is relatively high. Some white couples, fertile at sea level, became infertile at high altitude. Some white babies, however, are born in the *sierra*.[5]

To be sure, many white persons became fairly well adapted to the deficiency of oxygen. Over a period of time these have overcome the "climate agression." But the period of adaptation is itself regarded as a malady.[6] *Soroche* is the name given to mountain sickness thruout the *sierra*. One cannot accurately generalize on mountain sickness and who will get it, since no two people are alike, and the manifestations differing markedly in different individuals and at varying altitudes. Medical science to date is unable to tell in advance who will and will not get *soroche*. Some individuals never feel it; many are affected by it only mildly; most people, however, are greatly affected. The fact that a person gets *soroche* indicates

[5] See "Letters to the Editors," *Life*, October 15, 1951, 22.

[6] Dr. Monge prefers to use the word "adaptation" for recent arrivals and "acclimatization" for natives.

his general unfitness to remain at high altitude. Ultimately, adaptation comes to most people: sometimes months are required, sometimes years. Once mountain sickness is cured, however, the individual has acquired acclimatization.[7]

The properties of the arterial blood in high areas are a matter of the length of exposure (whether temporary or permanent) and of the level of pressure. The newcomer's condition differs from that of the temporary sojourner, and the latter does not reach the same characteristics as the "mountain man."

The first symptoms of *soroche* usually occur at around 10,000 feet, when lassitude, frontal headache, a quickening pulse, deeper breathing and nervousness are experienced. The face becomes pallid and the lips and finger nails blue—the result of insufficient aeration of the blood. Restlessness is common and sleep comes only with great difficulty.

The cause of *soroche,* experienced by going into increasing altitude with decreasing air pressure on the oxygen and carbon dioxide contents of the blood, is oxygen deficiency, especially in the brain. Barcroft comments on the disappointing amount of work that he and members of his research staff could perform during the day—the result, no doubt, of mental and physical fatigue. He found that best mental work followed when short periods of work were interspersed with considerable periods[8] of rest. Upon descending to sea level, one is freed almost immediately from *soroche.*

How does the body adjust to increasing altitude (omitting *soroche,* which was just discussed)? The blood changes:[9] the hemoglobin, red cell and hematocrit average values increase in the early stages after ascent, but vary considerably with the individual. Viault working in Peru at an elevation of 14,400 feet observed an increase in the number of red corpuscles per cubic millimeter in the blood of his own party and in that of the natives.[10]

Some white people living at customary altitudes thruout the world occasionally get a disease—polycythemia, which is an overproduction of red blood cells in the body—a disease in which the red

[7] Carlos Monge, "Chronic Mountain Sickness," *Physiological Reviews,* XXIII (1943), 166.

[8] Joseph Barcroft, *The Respiratory Function of the Blood* (Cambridge University Press, 1925), 17.

[9] Hemoglobin is the oxygen carrier between the lungs and the active tissues.

[10] A. Viault. *Comptes Rendus* (Paris, 1890) III, 91.

cells multiply from the normal level of 4,500,000 per cubic millimeter to as many as 7,500,000. It is possible that polycythemia may be related to cancer and leukemia. The Indians who live in the *sierra,* however, constantly have a high-level count up to 7,500,000 but have none of the headache, debility or other symptoms associated with the disease. In other words, the Indians live normally with a condition that at low altitude is sometimes fatal. Altitude polycythemia does not resemble *polycythemia vera* and there is no evidence for an increased incidence of *polycythemia vera* among the Indians of the high *sierra.*

No white people perform hard physical work in the high *sierra.* This is so now and it probably will be in the future. Nature seems to have destined the Indian and the *cholo* for work in this region. The writer has watched a small Indian carry in a day a load of approximately 100 pounds 30 miles on no food over a tortuous mountain trail and climb it "straight on." On such a journey he chews coca constantly, measuring the distance not in numbers of miles, as we do, but in *cocadas*—a *cocada* being the distance travelled before he requires a fresh quid. He customarily travels six to eight *cocadas* a day on a couple of handfuls of coca leaves.[11] The importance of coca in the lives of the mountain people is well indicated by the saying thruout the Andes that one can mine without water, machinery or dynamite, but not without coca.

SUMMARY AND CONCLUSIONS

We have noted the effects of altitude on human beings—Indians, *mestizos* and whites. We have seen that altitude affects the limits of crop zones, of animals and of human habitability. Particularly has attention been called to the fact that more than two-thirds of the total population of Peru dwells in this region—the *sierra*—indisputably the most unyielding to man of the nation's three regions and that the highest permanent habitation in the world is to be found here at an elevation of 17,100 feet.[12] We have noted that the Indian is acclimatized and never suffers from mountain sickness, except when he ventures into areas considerably higher than he is accustomed to. Acclimatization has been defined as the manner by

[11] C. Langdon White, "Coca Chewing in the Andes," *Pacific Spectator,* V. (Spring, 1951), 242-249.

[12] Isaiah Bowman, *The Andes of Southern Peru* (New York: American Geographical Society, 1916), pp. 52, 96.

which a human being's system is able to distribute the extra strain evenly over the entire organism so that no one part gives way before any other.

It has been pointed out that a few whites never get *soroche* but that most suffer considerably from it—the degree of severity depending upon the individual; that a measure of acclimatization is fertility and that most members of the white race require considerable time to be able to reproduce at high altitudes. It has been noted that all individuals are influenced by altitude, humidity, barometric pressure, solar radiation and ionization of the atmosphere; that these physical factors are important is indicated by the fact that altitude affects the incidence and treatment of tuberculosis, respiratory ailments, heart disease, sterility and infertility.

In conclusion, it appears that the *sierra* was in the past, is now, and must always be the land of the Indian and/or mixed blood. This being the case, much more attention must be given to the Indian and his problems than is now the case. The present Peruvian government is much less concerned and appears to be less interested in the Indian's welfare than were the Inca leaders. In fighting their enemies on the coast, Inca military tacticians never failed to take into consideration the matter of altitude: they utilized two armies, one being held in reserve in the *sierra* while the other fought in the lowland (the coast) for several months. Then the fighting army would be withdrawn, being replaced by the one that had been held in reserve. Thus the Incas taught future generations how to deal with the high altitude problem; they developed a plan for acclimatizing their people, something the post-Conquest governments have thus far failed to do. This omission has had disastrous consequences. As a result of medical and physiological research now being carried on at sea level, at 11,000 feet and at 14,800 feet, scientists hope ultimately to make a case so strong scientifically that the Peruvian government will pass social legislation for conserving rather than wasting this most valuable resource of the Andes—the mountain Indian.

FOR FURTHER READING

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10. ——— "Out of this World," *Pacific Discovery,* II (May-June, 1949).

INTRODUCING MAPS IN THE FOURTH GRADE

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Map work seems a pain-in-the-neck chore to many. If maps and map work can be introduced as fun early in life, there should be no aversion to more detailed map work later, and comments of prejudiced individuals will have little or no effect on the budding Geographer. In adult life a greater readiness to refer to maps should result.

This is the way I handle map work in the fourth grade in hope that the above goals may be reached to a greater degree.

GROSS FEATURES OF THE EARTH

I introduce maps right at the beginning as a part of an orientation to social studies. We use a large wall map and slate globe. On these we locate the continents and the oceans. By the time we have completed this work the boys and girls know the names of and can locate each of the continents on both wall map and globe. They learn that a continent is a large mass of land and that an ocean is a vast body of water. They also learn the difference between an island and a continent.

In addition the boys and girls trace a large world map on which they write in the names of the continents and oceans. Each is given

a small map of the world (mimeographed) and during our map exercises the names of the continents and oceans are written in.

My boys and girls enjoy working with maps. When studying continents they color each continent a different color and print the name of each on their maps. The same process is repeated with the oceans. Here the boys and girls are told that water is always blue on maps. I might add that during these map exercises I stand before my class holding a map just like the one they have and point to each of the continents after they have had an opportunity to locate the continent or ocean in question. The size of the maps tends to confuse some of them and I think it sound practice to locate places on a small map and then to locate the place on a large map and visa versa. I also call to their attention the shape of the continents. We have a liquid duplicator in our building so I can make as many copies as are needed. Thus it is possible to repeat this type of map work as often as is necessary.

Children in this age group just love to color. As we color we talk about what we are doing and questions are encouraged. Before the children realize it the majority have learned the names and location of the continents, oceans, the countries studied and a good number of the states and rivers.

EXPLORATION APPROACH

As we begin to study the routes taken by Columbus, Vespucius, Magellan, and others, the boys and girls take turns tracing the routes on the slate globe and on the wall map. Most of them volunteer eagerly. They then trace the route being studied on their own copy of the world map.

As each explorer is introduced, we follow his route on the slate globe and then on a large wall map. There is a great deal of excitement to see who will be the first to do it correctly. It is heartening to watch them as they study the map in their text and then look up at the large wall map and again at the map in their text; then raise their hands and walk over to the map and trace the route studied on the map or pick up a chalk and trace it on the slate globe.

Each explorer is sent by a country. The word *country* must be defined. By now the children know that a continent is a large mass of land. Some volunteer, "A country is a small part of a continent." Now we proceed thus: Let us see if this definition is correct and we

write the definition on the board. In what country do we live? Elicit United States. In what continent is the United States? Finally, we decide to look for the United States on the continent of North America. After we have located the United States we note that Canada to the north of us and Mexico to the south of us are countries also. Spain can be located quite readily and we compare the size of Spain with that of the United States, Canada, and Mexico. We note that the other European countries are much smaller than any of the above three. The sizes of the countries of South America are noted also. Next we arrive at the conclusion that a country may be large or small. A country is a part or a division of a continent is a better definition. The fact that each country has a language of its own is brought up and discussed. And later, as we study the colonization of the New World, we must answer such problems as "Why do we speak the English language in the United States" and "Why is Spanish spoken in Mexico."

World Wall Map

By now the group assigned to prepare a large wall map of the world has completed its task. Pupils print the names of the continents and oceans on the map and then the continents are outlined and colored lightly to make it possible to show a few of the countries such as Spain, France, England and Holland. The route followed by each of the explorers is shown on this map. After the route of Columbus had been traced (we used a black broken line) I ask the class, "What does this broken black line mean?" "That's the route that Columbus sailed," choruses the class. "Fine, just suppose someone stepped into our room and looked at our map—would he know what that line stands for?" "We must therefore show in some way what this line means, and I explain how it is usually done. I draw a square or rectangle on the board similar to the one I had marked on their wall map. They do the same on their desk copies of the map. Inside the square I print the word *Columbus* and then draw a broken line. The children do likewise using a black crayon to make the broken line. I explain to them that this is called a *Legend* and write the word on the board. We pronounce the word together and they print it in the proper space on their map. A similar procedure is followed as the other explorers are studied, with different colors used to show the different routes.

CONSTANT MAP USE

A large map of the United States is traced as we prepare to study the Colonization of North America. Parts of Canada and Mexico are shown also. As each colony is settled the name of the State is printed on the map and the State is outlined and colored. A suitable legend is prepared.

Our map work does not end with Social Studies. In reading we follow the pioneering Burd family as they leave their home in Pennsylvania and seek a better one in the Ohio River valley. The Johnsons take a trip. We follow them from their home in Illinois to Chicago, across the corn fields of Iowa and eastern Nebraska, thru North Platte into the Yellowstone, to Salt Lake City and San Francisco.

We read a story about Jane and Dick, who visit with Uncle John in Alaska. The kind of clothing they wear is discussed. Some suggest that it is colder in Alaska than in Nebraska. "Why is it colder?" someone asks. This is a good place to review what we have learned about the equator.

In map study, directions are important. Show how the latitudinal and longitudinal grid represent the primary directions—north, south, east, and west. Be sure the class learns to look for a direction arrow as a part of a map key. Prepare students for the air age maps which are becoming more and more important.

Maps can and should be fun—thru the fourth grade and thereafter.

MOTIVATION VIA VIDEO

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"It's an ill wind that blows no good." This old saying may be applied to the present problem of television. For several years some educational leaders have been complaining of television ruining study habits in the home. It is not my purpose here to argue the point, but rather to point out that we, as teachers, should be taking advantage of the children's interests in this new medium of entertainment and education. While much has been done along this very

line of thinking, I would like to tell of an experience I had in the hope it will provide someone with helpful suggestions.

The Idea is Born

I had been looking for a chance to develop a unit of study by using the committee system and the upcoming section on Central America seemed to be my chance. Yet I wanted to do something that would carry with it some of the excitement of the unusual and the motivation of something different. By conducting a little informal survey I found that virtually all of my seventh graders were "fans" of such television programs as "Space Cadet" and "Captain Video." I took my cue from this outer space knowledge and began to set up the project with the class.

Destination—Central America

I drew a sketch of a flying saucer on the blackboard and explained to the class that for the next few weeks we would be visiting "monsters" from outer space. We were from Planet X and we were being sent via the flying saucer by our Supreme Commander, Mr. K. to Central America (K. is the first initial of our principal, hence the use of Mr. K.). I was the Commander of the space ship and the entire class was the crew. We had been instructed by the Supreme Commander to seek out the area known to earthmen as Central America and investigate its possibilities as a base for our people from Planet X. While we were sailing thru space we planned the details of our investigation.

Goals and Procedures Are Established

For the sake of expediency we decided to split up into groups with each group being assigned one particular country. Fortunately, since these groups were formed by volunteers, the class was almost evenly divided. I did "place" some of the more capable leaders so that each group would have a good Captain. In every case the groups, realizing their task, elected these leaders of their own accord. We gave the name "Flying Teacups" to each of these groups and I drew several issuing out of the mother flying saucer. This done, the crews assembled together again as one group. "What information should we seek to discover?" The students decided the goals and I listed them on the board for each crew to copy. "We" decided that we should find out what the people of these

countries do for a living. If it is farming—what kinds of crops do they grow? Why do they grow these crops? Would the climate be suitable for us since we are used to outer space weather? What is the geography of each country? Do they have any natural resources? What is the history of each country? What kind of government does each have? Finally, of what value is all of Central America in the scheme of world affairs?

GETTING TO WORK

Anchoring our flying saucer a short distance out in space, I sent the teacups on to their destinations. How would we get the information we were after? Every crew, regardless of their assignment, was held responsible for the coverage of Central America in the text. I also made arrangements with our librarian to segragate all the books dealing with this area and on the first day of our adventure I took each class to the library. Each crew found the books dealing with their target on separate tables. Every student was assigned a particular subject, e.g. occupations, by the crew captain. The students worked in groups or individually taking notes. Following this initial trip to the library, I was able to bring all books to my room and thereafter we worked in the classroom.

Students at the seventh grade level have not had much experience, if any, in note taking and outlining. I talked it over with their Language Arts teacher and she did some work in her classes to help them on the mechanics of outlining. I also spent some time in improving note-taking technique. All of this was done before the class got involved directly in the work. A situation like this offers a good chance to integrate classes.

Once the work got under way, my job as Commander called for me to circulate about the room offering suggestions and keeping order. The crews moved their tables about so that each teacup was isolated. To help maintain their identity, most of the crews brought in cardboard signs and posters which indicated their target. The posters generally depicted little green monsters of one shape or another. The investigating and note-taking activities lasted for a little over a week. Once or twice we had to call a meeting of the whole group to discuss and solve any newly arisen problems. The captains were responsible during this period to see that every crew member was getting his work done. When each captain was able to report that his crew was ready to return to the mother flying

saucer, we moved back into one group again in the class. All that remained to be done was the summing up and the preparation of reports.

Reporting In

In an activity such as this, there has to be some method of evaluating progress and concepts gained. One way which I used was to have each student file a written report of his findings with the Commander. This report was to include all of the facts that could be gathered on that particular topic and the observer's personal evaluation of his trip and assignment. These reports were turned in and graded, then returned to the students.

The question may come to your mind, "How did every student learn about those countries and topics other than the one to which he was asigned?" As I explained to the class, it was absolutely necessary to relay all of our information back to Planet X as quickly as possible. In keeping with the spirit of the adventure, I was able to secure a set of earphones with an accompanying mouthpiece. As each report was read over these phones for the benefit of Mister K., the entire class listened in. Following each report, the students were encouraged to ask questions and to take notes for their own benefit and future reference. I also took notes on these reports and was careful to point out the important parts of each report. With the notes each had and the textual information, I was able to test all of them for certain concepts which we had set out to gain.

Contributions Toward Development

Besides becoming acquainted with information about Central America, I feel that there were certain other benefits gained from this project. Some I have already pointed out. It would seem that "subjects" are more meaningful when they can be connected and function together. Instead of working at cross purposes, I was helping the Language Arts teacher achieve some goals and she was helping me. But most important we were helping the children gain practice and skill in research, organizing their thinking and work, and in being able to assemble their results in writing and in oral discussion. Everyone does these things everyday. Obviously the more practice you can get, the more efficient and successful you can become. This committee approach also helps the students to appreci-

ate the value and necessity of working together. I need not enlarge on the implications of this as I think they are rather obvious in the light of our democratic theories. The obvious value lies in the stirring of imagination and interest, and the student need not be the only one so motivated. Here is an opportunity for students to learn of other people and their problems without looking upon the process as a chore. It gives ample opportunity for a feeling of personal achievement, a feeling which all of us seek for. Perhaps we could say that some students were "tricked" into working by becoming so interested in the imaginative part of the program. Imagination sometimes stirs up logical questions and everyone knows that children are always seeking answers. The effects of this project were not soon forgotten. Since the students had worked on the unit. they became interested in the possibility of learning more about the people. We cannot always learn all there is to know of a people by reading books. Thus, as a direct outgrowth of our visit from outer space, I was able to arrange for all interested students to receive "pen-pals" in Central and South America. Needless to say there was a great deal of interest in receiving letters, stamps, pictures, etc. from the very people they had been studying about. Believe me, the fact that while we are celebrating Christmas in the snow the people of Buenos Aires are swimming at the beach is much more meaningful when their pen pal tells them about it than when the teacher does.

A LOOK BACKWARDS

To accomplish such a project is not a matter of hit or miss thinking. Careful planning is needed to direct the thinking of the children in order to avoid a maximum of time wastage. There must also be available a wealth of materials for the students to use. Constant supervision is needed not only to keep order, but also to prevent a child from becoming lost in his research. As I suggested before, a good deal of imagination must be presented in both teacher and pupils. The students' reactions to this activity were varied. Generally the ones that said they did not like it were the ones that do not like being put on the spot where they have to produce instead of sliding along on someone else's efforts. However, many liked the idea and cooperated completely while others were caught up in the spirit of the thinking and worked despite themselves. Still others liked to do individual work anyhow and did

a good job. Student reaction to any activity is usually divided in such a manner. However, I feel, and the results of the tests and the general quality of the reports seem to bear this out, that this activity was more than worth while. I hope, also, that there were benefits gained which cannot be measured by a grade. Any success which this project achieved can be largely placed upon the fact that the children were caught up in something with which they could identify their out-of-school hours. Certainly our work as teachers can be much easier, more enjoyable, but most important of all, more fruitful, if we strive to take more advantage of children's interests.

WHERE IN THE WORLD ARE WE?

Geographic Understanding for Political Survival and Progress*

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PROGRESS OR SURVIVAL?

Had this topic been listed on such a program as this twenty years ago, I doubt that the title would have included the word "survival." That your chairman included it in the topic he assigned me reflects the fact that we Americans have come to realize that we live in a dangerous world—a world in which great organizations of power, the sovereign states, operate independent of any superior control. Peoples and governments of outside countries, over whom we have no control and but little influence, can make decisions for action that could lead to the destruction of all that is most precious to us. While we may hope to dissuade them from such actions, if persuasion fails, survival depends on power.

Some would have us leap over the problems of survival to the goal of progress, forgetting that progress takes time; unless we have the power necessary to survive through that time, we cannot reach progress. The progress we seek, I take it, is the development of an international order *strong* enough to assure that the

* Paper read to the National Council of Geography Teachers, at the annual meeting in Washington, D.C., August 6, 1952.

problems among states will be solved without resource to the destructive decision of war. An international order can be only as strong as the strength of those states willing to support it with power as against the strength of those who may oppose. Hence it follows that the prerequisite for progress is the same as for survival: power to maintain security of peoples against aggression is the necessary factor for both purposes.

THE NEED TO UNDERSTAND OUR POSITION IN THE WORLD

For intelligent planning for both these objectives a first requirement is a clear understanding of where we are in this world: a correct picture of its geographic structure and of our location in that structure. Elementary as this question is I fear that we professional geographers have not been effective in providing the clear and reliable answers.

I reach this conclusion from examination of current discussions of America's relations with the rest of the world, which rightly occupy so much of our attention in these years. In many of these discussions—by educated people, leaders of public opinion—I discern unspoken adherence to a set of concepts concerning America's relation to the world and its location in world geography which was acquired in earlier years but remains the unquestioned background of current thinking. This of course is very natural. New occasions demand new decisions, but few can be expected—even under the impact of great events—to revise the basic concepts they have acquired in the days of their youth.

Hence the American people are attempting to judge what they should do in 1952 in terms of a pattern of concepts which had been developed back in the relatively quiet time of the nineteenth century and transmitted to our time by parents, newspaper writers, political speakers and, perhaps, school teachers. Let me sketch rapidly the outlines of this heritage of past thought concerning the situation of the United States in the world.

WHAT AMERICANS THOUGHT OF THEIR POSITION IN THE WORLD

Americans thought of themselves as being in a world apart; events in foreign countries were of but secondary concern; they were busily engaged in bringing civilization to the wilderness and in developing a great and unified nation across a continent. When they did look outside their own country, they thought of their im-

mediate neighborhood as the western hemisphere—over which they were pleased to extend protection under the beneficent blanket of the Monroe Doctrine.

From this citadel of peace they watched with olympian detachment the economic vicissitudes, political tensions, power rivalries and armed conflicts of more benighted lands. In contrast to the peoples of Europe, to whom the threat of war was a part of normal life, Americans regarded war as an abnormality. With the establishment of the continental boundaries of the United States a hundred years ago, the American people had acquired all the territory they desired for national development. This they were willing to defend with full military force, but they saw little danger that it would ever be threatened. Hence neither war nor the fear of war need have any part in the normal planning of their life, whether individual or national. The United States would keep the peace at home and among its near neighbors; if the rest of the world could not do likewise that was regrettable but not the concern of America.

Thus, in crude outline, the typical American's view of the position of his country during the greater part of its history. It is also, I think—tho here I speak from less knowledge—a view of the position of America which many Europeans would express, tho no doubt in somewhat less flattering terms.

This view of our situation in the world appeared firmly based on the elementary facts of world geography; it stands out clearly on the world maps we commonly use. What do these show?

First, they show us the world divided into large unit areas of land, the continents nearly or quite separated from each other by vast spaces of empty oceans. Our continent, North America, has only one neighbor, South America. These two continents form one-half the world called the Western Hemisphere, within which the United States, as the only great power, appears completely secure.

One common form of world map confirms popular impression by showing our Western hemisphere completely separated from the Eastern Hemisphere. And on most single maps of the world, whether Mercator's or any other having a north-south orientation, our habit of looking up and down the map gives the impression of proximity of the two American continents and their common remoteness from those in the eastern hemisphere. In some European countries students are even taught to think of the Americas as a single continent.

This concept of the world divided by nature into two halves appeared to provide the sound basis for our command, in the Monroe Doctrine, that the other half of the world should not interfere in ours, as we had no reason to interfere in theirs. That is to say no part of that other hemisphere was of more concern to us than other parts; in any conflict among its states, the outcome was no proper concern to this country.

For many people on both sides of the Atlantic, therefore, American intervention in Europe in the first World War was an impious denial of a division ordained by nature. Since the ocean barrier had failed to serve its purpose, it must be bolstered up by words. Leaders plotting aggression in Europe demanded freedom from American intervention, apparently on the principle—if I may paraphrase Lincoln's reply to Douglas—that if one European power choose to enslave its neighbors, no non-European power should interfere. To this demand the American people, thru Congress, acceded: the neutrality act of 1937 announced that the United States would not concern itself with whatever took place in Europe.

Today, only fifteen years later, the pressure of events has persuaded the American people to accept a complete reversal of this policy, even when Europe is not at war. This departure from long-established principle of policy is surely one of the most radical in history. But those who retain the inherited myths of our position, if they accept this change, accept it without understanding. So long as this confusion remains we will continue to stumble, even though we stumble forward; we will not be able to plan calmly and intelligently for the future.

THE ERRORS OF THIS VIEW

I conclude that we must re-examine critically the inherited picture of our relationship to the rest of the world and the geographic bases on which it was presumed to rest.

In doing this, I suggest that you ask yourselves whether we who teach geography bear some responsibility for popular misunderstanding. Not that geographers have consciously taught that the United States had developed in happy and secure isolation from the rest of the world; the interdependence of nations has been, at least in recent decades, a theme song in many of our courses. But I doubt that we are effective in teaching the fundamentals of world geog-

raphy by principles or theme-songs or statistical tabulations of trade. Geography is the study of places and areas and the relations among them, and we learn these things by studying places and areas.

As long as we limit our attention to land areas and associate these together in terms of large land units, referring to the seas only as an after-thought, we inevitably etch deeper the impression given by our maps, that the seas are negative in human relations and hence form the great barriers between peoples.

I am not forgetting that man is a land-animal, relatively seldom putting out to sea. And of course there are more people living in the Amazon Basin than can be found at any one time in the North Atlantic Ocean. But the work being done by those few in the ocean is vastly more important to the people living on either side of it than is the case of the people of the Amazon region.

The fundamental error in popular geographic thought is that of regarding the land masses of the continents as the basic divisions of the world. You and I know that this is false. Since the time of Columbus and Magellan, the oceans have aided, rather than opposed, the spread of settlement, economic connections, cultural penetration and military action. Because the oceans are nearly empty, they do divide, but they do not separate. The great barriers of the world, other than the frozen Arctic, have been land areas—the vastly undeveloped wildernesses of desert or forest.

This is no new idea in geography. Nearly half a century ago, Hettner suggested that the conventional division in geography texts by continents was arbitrary and misleading. Yet professional geographers the world over have continued to accept its convenience, without considering what ideas we are thereby entrenching in the minds of students. I am chagrined to recognize that it was not a geographer but an economist, Staley, who delivered the most effective attack on this concept in his article on "The Myth of the Continents."

Closely associated with that fallacy, and equally deeply entrenched in the geographic thinking of people both in this country and elsewhere, is what I have called "the myth of the hemispheres," which our colleague Boggs has so deftly exposed. The so-called "western hemisphere" is a cartographic device which has been responsible for almost as much erroneous thinking about world geography as the Mercator projection. Both of these map

representations of the globe, reinforced by the manner in which we organize the regions of the world in our teaching, indoctrinate the idea that South America is our near neighbor—in contradiction to the facts: the important countries of that continent are significantly remote, Buenos Aires farther away than Constantinople or Moscow!

THE NORTH ATLANTIC WATERWAY

In reality, of course, the nearest neighbor of the United States —other than Canada and the Caribbean countries—is Europe. Much the same is true in reverse; excepting for the opposite shore of the Mediterranean, the nearest neighbor to Europe is Anglo-America—the United States and Canada. From England and all other countries of Northwest Europe, the distance to New York is less than that over the normal sea-routes to Nigeria, or to Suez, or to the Crimea, not to mention countries beyond those points.

The distances themselves, however, are not so important as the use made of the North Atlantic Waterway. Thruout the history of the United States, from its earliest colonial settlement down to the present, this waterway has been the great highway for migration, for shipments of the capital goods that made possible our development, for return shipment of agricultural produce and later of manufactured goods, for cultural interchange by persons, books and journals, and finally for the movement of armed forces in naval transports escorted by fighting ships.

In sum this North Atlantic waterway has been one of the fundamental factors in the human geography of the United States. Conversely it has also been one of the major factors in the modern development of western Europe—for Great Britain in particular, it forms the true life-line of economic empire, the single, most important basis for the very life of her people.

Again there is nothing new in all this; but have we been effective in imparting this basic knowledge in the education of the American people? Speaking only for myself, I can say that these relationships were not called to my attention until my graduate work, when they were made a permanent part of my thinking by Professor C. C. Colby.

That instruction, it might be noted, came before the air-age. This has altered but not revolutionized our situation, excepting that it has added the Arctic as a shorter route for bomber planes.

But the basic concept could well have been taught even before the age of steam. Indeed, in the pre-railroad era, the Atlantic route was *relatively* shorter, in comparison with land travel, than it has been since.

Our basic situation in the world has not been revolutionized by technology, as many would think. It remains essentially what it was before, but certain circumstances which previously permitted us to live safely in ignorance have now changed to such a degree as to compel us to understand our situation.

The first geographic understanding necessary for the survival of the United States is to recognize that we are a part of the North Atlantic quarter-sphere. This is the most important aspect of our location, now as in the past. The Atlantic quarter-sphere consists of North America and Europe (including, as I will explain shortly, the greater part of the Soviet Union), *and* the intervening, connecting seas, both North Atlantic and Arctic. While this great area contains but a third of the world's population, it includes nearly ninety percent of its industrial development. With the eclipse of Japan, it holds all the major powers that are effectively organized for external military action.

The United States in the Atlantic Quarter-Sphere

On its western side, North America—together with the Caribbean countries—forms one continuous strategic unit with close economic interrelations. On the other side is Europe, together with the Mediterranean countries of North Africa and the Middle East.

In the comparison of power on the two sides there is a paradox that can lead to dangerous thinking unless we understand it clearly: the United States is the strongest single unit in the entire area and enjoys a position of supremacy on its side which no state holds on the other; but the European side in total has by far the greater population, greater economic production and greater military potential.

Again I am including most of the productive area of the Soviet Union in Europe. If we are to think in terms of geographic realities, we must beware of a new and dangerous myth by which Russia would be excluded from Europe by *mere semantic mutation*. There is no physical separation between western and eastern Europe, but only a series of boundary markers in open fields between the last farm or village on one side of an imaginary line and the first farm or village on the other. There is no break in road and railroad

routes. All Europe is a single theater of power. Indeed in terms of continuity of settlement, transportation and industry, we can no longer accept the Urals as the eastern limit of Europe; that must be pushed eastward to the neighborhood of the Yenesei. Steel produced by Russian workers in the Kusnetz Basin may be transported by train—whether in the form of farm machinery or of artillery shells—to the Elbe, or even to the English Channel.

THE POWER SITUATION IN THE PAST

Fortunately for the American people, the significance of our location in this major quarter of the world has been recognized thruout most of our history by those responsible for the conduct of our foreign relations. Usually, tho not always, they recognized that our strategic position was by no means one of security guaranteed by nature but rather one of *vulnerability.*

When the United States was relatively weak any of three or more powers in Western Europe had the capacity to send armed forces across the waterway, either directly or by way of bases in the Caribbean, to attack our shores and invade our land—as we had learned in the War of Independence and again in the War of 1812. As we grew larger it was still possible for some combination of European powers to launch such an attack.

That no attack was even threatened during the century following Jackson's defeat of the British forces before New Orleans was not because the ocean could no longer be crossed nor because of any difficulty in finding unprotected harbors or beaches along the lengthy shoreline of the Atlantic and Gulf coasts. What restrained any potential European enemy was the division of power within Europe itself; the certainty that to undertake any such major venture far from home would expose itself to the gravest dangers close to home. It was, in short, to the advantage of every European state to permit the United States to keep aloof from the power conflict in Europe so long as none could be sure of permanent American support and as long as the United States was not so strong as to constitute a danger on the sidelines.

Further, and more specifically, it was to the interest of the power that held the European keys to the Atlantic waterway, Great Britain, not only to maintain the balance of power in Europe, but also to maintain the status quo in both Americas and thereby insure the security of the waterway itself.

In consequence of this situation among the states of Europe,

the United States during the century before 1914 was able to follow a policy that was in no proper sense one of isolation, but rather of extraordinary independence. It could demand that no European state should attempt to regain or establish power in either North or South America, thus greatly increasing its own security, and could count on a European navy, the British navy, to support that Monroe Doctrine. At the same time the United States could participate freely in all the positive aspects of international life across the Atlantic waterway, but leave to Great Britain the difficult and dangerous task of intervening when necessary in the power politics of Europe, thus avoiding the risk of America becoming involved in European wars.

Finally—an element of luck—the American stake in the North Atlantic waterway, which had involved us in minor degree in Napoleonic wars and was to involve us in major degree in the two great European wars of our time, did not draw the United States into any of the European wars of the intervening century simply because none of those became general European wars penetrating into the Atlantic.

It was these conditions, primarily conditions within Europe, that caused the obstacle of the Atlantic Ocean to appear to have become a barrier. Nearly all of these conditions have changed radically in our life-time.

THE NEW SITUATION

The first change is in the United States. In place of a minor power that could be safely ignored in its chosen position of distant aloofness, it has developed into the strongest single power of the North Atlantic area—indeed of the world—and in two great wars has demonstrated its ability and willingness to determine the outcome. Because it has this power and has now used it twice after first insisting that it would not, there is no possible way in which the United States could now determine that it will not use its power in any future European conflict. The United States has become inescapably a major factor in the European situation. A state that attained domination in Europe could not dare to permit the United States to remain in independent isolation, and the United States does not have that supreme power that would be required to maintain independent isolation against such a state.

Other changes have taken place within Europe. The division of power in approximate balance, which was maintained during the

nineteenth century, was badly shattered in the first World War, inadequately restored thereafter, and was completely destroyed by the second World War. While Britain's interest in keeping other European powers out of the Atlantic is no less than before, her power to prevent it is relatively far less. Indeed the new weapons developed since the Battle of Britain in 1941 make it doubtful that Britain alone could even maintain the home base which forms the European key to the Atlantic.

THE UNITED STATES IN THE ATLANTIC HEMISPHERE

I have dwelt at length on the situation of the United States in the North Atlantic area because the concentration of industrial, political and military power of the world is in that area. Therefore the relation of the United States to any other part of the world must be considered first in terms of its effects on the situation within this, the dominant area of the world. Take for example, the two land areas on either side of the South Atlantic—South America south of the equator and Africa south of Sahara. These areas of relatively minor population and power capacity may be considered as appendages of the North Atlantic area—not of North America and Europe respectively, for southern South America is roughly equidistant from them both as is tropical Africa, in terms of normal sea-routes. Further, since these appendages approach each other closely in the Mid-Atlantic, they provide an alternative route between Europe and North America—round-about, but with a short sea-hop.

These four major land areas, together with the North and South Atlantic Oceans and the Arctic, form in all one half of the world—the Atlantic Hemisphere. As Bogs pointed out in the illuminating article in which he first constructed this hemisphere, it includes nearly all the lands developed under western culture—the Hemisphere of Western Civilization he called it. If we must think of the world in terms of hemispheres, and it is most difficult to encompass the whole world in mind at one moment, then surely this is the hemisphere that includes most of what is vital for the United States.

THE UNITED STATES AND THE OTHER HEMISPHERE

What then of the other half of the world—the lands bordering the western Pacific and the Indian Oceans? Where are we in relation to these areas? Certainly we cannot afford to forget this other

half of the world. Here live slightly more than half the world's population where two countries, China and United India, represent by far the largest communities in the world.

Trained geographers, however, should not leap with closed eyes into the speculative future by translating mere population figures into comparable estimates of economic, political or military power. Any one of three or more great powers of the North Atlantic area can bring to bear in that other half of the world more power than any country, or any feasible combination of countries, therein can produce.

Now for the foreseeable future—as far, that is, as one can foresee by reasoning from known facts without benefit of the crystal ball, the part which these lands can play in determining their own future, as well as that of the rest of the world, must be measured in terms of the effects they may have on the relative situation of the countries of the North Atlantic area. Important factors in these countries outside the Atlantic Hemisphere are their positive and negative contributions of economic production and markets; psychological-political influence—especially thru the critical area of the Middle East; and manpower and strategic bases.

Among the major powers of the North Atlantic area, two occupy unique positions in relation to this other half of the world: The United States not only faces the Atlantic, with its center of gravity close to Atlantic channels, but also looks westward across the Pacific to the Far East. The Soviet Union, with its center of gravity in European Russia, likewise near Atlantic channels, extends eastward across the nearly barren lands of Central Asia to the borders of India and China, with one long finger of population and transport reaching to the Pacific.

The United States in the World

These relationships remind us that if the division of the world which we have been discussing is more realistic than the conventional division, it is nonetheless to some degree a distortion of reality. Our world is one world, since the work of Diaz, Columbus and Magellan, forever indivisible.

Within this one world the United States occupies a uniquely important position, and whether we like it or not, this is one of the clearest facts in world geography today. From this position the United States has the economic, political and military potential to

bring to bear in almost any region of the world no matter how remote—across whatever oceans, deserts or forests—an increment of power that can be decisive for the fate of that region. And because no region or area in this one world can be dismissed as of no significance for survival and progress of all other areas, this unique position of the United States forces upon it a responsibility, for its own future as well as for that of the world as a whole, to concern itself for the fate of countries located in almost every part of the world.

A GENERAL-EDUCATION EXERCISE IN GEOGRAPHY

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THE PROBLEM FACING THE TEACHER

Geography teachers have to face the students' question, "What is geography good for?" The simple library exercise described here is intended to stimulate the students to find some of the answers thru their own activity.

The exercise may serve to impress upon the student the values of geography, and at the same time to give him some conception of the wealth of resources in geography to be found in the school library. Also the exercise may bring out some of the values of geography in general education. Among other things with which it is concerned, general education is closely related to the everyday problems of people.[1] This emphasis upon the usefulness of geography in solving people's problems is also supported by recognized principles of educational psychology, relative to motivation.

The problem of the nature of geography has received much attention from advanced workers in geography. It appears that less attention has been given to analyzing the applications of geography. It might be a great help to the geography teacher if Richard Hartshorne, for example, were to write, as a sequel to his *Nature of Geography,* an equally penetrating study of the needs for geography, the uses of geography, the ways in which geography is put into application. Possibly the same method might be used in both studies.

[1] American Council on Education, *Cooperation in General Education,* The Council, Washington, D.C., 1947, p. 205.

The Assignment

Near the middle of the semester, each student was given a three-page mimeographed list of reference materials, periodicals and representative circulation books in the school library that are especially valuable resource materials in geography. The students observed that these materials fall in an unusually large variety of classification in the library's Dewey Decimal System—in contrast to other subjects.

Each student was asked to select a geographic problem of his own choosing. The problem selected by the student was to be one in the solution of which the student believed geography would be especially useful. It was to be a practical problem such as someone, somewhere, might have to solve as part of his daily living. This might be a problem of an individual person; or it might be a problem of some major social institution such as government or business or the schools. The student would "make believe" that he was in any part of the world he might choose, and was faced with this problem. Having decided upon a problem, the student was asked to list six resources in the library that would be appropriate for solving this problem: two articles in different periodicals; two different reference works; and two books in the circulation collection of the library. It was found that the assignment was not difficult for college freshmen to understand. Students made a choice of topics readily for themselves, according to individual interest.

Interpretation to the Students

When the students' lists were handed in, these were summarized by the instructor. The summary, reported to the respective classes, served as a research report developed thru the students' free choices of topics, on the uses of geography.

About one-twelfth of the problems chosen were those of the individual person relative to his occupation. Other types of individual persons' problems, such as health or marriage or citizenship or recreation, were not chosen by any of the students. About one-fourth of the problems chosen were those of political institutions, and the remainder were problems of economic institutions. No problems of other institutions, such as the school or the church, were chosen.

The problems that the students chose may be classified in another way, as follows. Over half of the students chose problems

concerned with the entire nation of the United States; about one-eighth chose a problem of a smaller region within the United States; and the others were problems of foreign countries.

Classifying them from still another point of view, about one-eighth were on understanding the natural environment; one-eighth on conservation; one-fourth on rather general economic conditions somewhere; one-fourth on a commodity study; and one-fourth on the utilization of a broad group of commodities or resources.

CONCLUSIONS

Some conclusions appear to follow from this experiment. It seems that freshmen readily understand an assignment of this type. They take an interest in it. They become better acquainted with library materials as a result and develop more interest in the geographic significance of such sources. They become more familiar with the card catalog and the periodical indexes. They become more aware of the applications of geography to functional human problems: of the general-education values of geography. The students obtain a new glimpse of the profound significance of the problems that geography helps to solve—those of individual persons and those of the major social institutions of the modern world.[2]

LAND MANAGEMENT EDUCATION AS A FUNCTION OF COLLEGE GEOGRAPHY

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Land management is the chief function of a number of federal and state bureaus and agencies. On what may be a lesser scale a great many ranchers, industrialists, foresters, farmers, mine operators and others are also land managers using the term "land" as geographers understand it. If the "land" is to be administered for its wisest use, it is necessary that those in positions of authority, at all levels, be educated in land management. Increased attention being devoted to underdeveloped areas of the world emphasizes the need for persons so trained.

Land management education is suggested particularly as a field for exploitation by geographers in departments of a university or

[2] Constantine Panunzio, *Major Social Intitutions,* Macmillan, New York, 1939.

college possessing broad systematic science curricula resources. It is believed that a number of departments already have adequate training resources in geography. Furthermore it is considered that only geography can effectively complete and draw together the training needed by the land manager.

The establishment of schools of natural resources in some institutions suggests that the program as it affects geography is one of urgency.

Need for Trained Land Managers

The growth possibilities for a geography program, stressing resource use and land management, seem to be unusually good in a number of American institutions. The wide variety of basic resources and the large number of land use opportunities, which may be present on a single ownership, suggest a need for devoting more attention to the broad subject—land management. The increasing population of the United States and Canada, as it creates more complex problems of wise use of the natural resources has focused attention upon them.

Wise multiple use management, of farm, forest or ranch, depends upon broadly trained administrators and not the specialists who have approached the problem with a one-sided point of view. Persons with broad training in the field of land management could handle multiple use units, in both private and public ownership for the greatest good. Furthermore, by virtue of their training, they could manage specific resource properties in such a manner so as to secure maximum returns from those resources yet taking cognizance of other values. They could also perform valuable services in national planning on a regional basis. This, the integration of specific efforts into a regional approach, demands that there be men able to synthesize the findings of specialists and present plans for coordinated action. Such plans, to bring the greatest good to the greatest number, should be prepared by men with the ability to perceive the near and the far, to recognize conflicts of interests and to reconcile them, and to induce practical considerations into theoretical thinking.

Land under federal jurisdiction is generally managed on the basis of a particular resource; furthermore, bureaucratic control is often unsympathetic to local interests. For the ultimate greatest benefit, public as well as private land (including resources) should be in multiple management. Lest resources be placed in an economic strait jacket, flexibility, to provide for the events of time, must be

a part of this management. But it would seem that the men of broad vision and depth of knowledge and understanding, necessary to the success of the multiple use concept, are all too few. The bickering of the federal bureaus indicates a narrow management of the public holdings, in general, obviously leading to the conclusion that the leaders in the present federal resource setup are not competent, because of their limited and biased views, to lead in wise land management (for example in regional planning).

Moreover, there is a need for competently trained individuals in other phases of land & resource utilization. Why should a lawyer lead a party investigating resources in an undeveloped country for the International Bank? Is not the geographer better fitted to perform the task of integrating the findings of the specialists? Why does not a giant corporation such as the Arabian American Oil Company make full time use of a geographer in an advisory capacity?

In *Tapline* (the story of the world's biggest oil pipe line) published by the Trans-Arabian Pipe Line Company; New York, January 1951, there is the record of a resource use problem that could have been anticipated by the geographer. Forty water wells were drilled along the pipe line. "It took two years to drill all those 40 wells, but the unexpected problem they created manifested itself when the first brackish water was pumped to the surface. Apparently every Bedouin in Arabia heard about it immediately." . . . "As far back as a year ago a rough count indicated that one well alone was supplying water to 12,000 Bedouin, 20,000 camels, and 40,000 fat tailed sheep and goats." The geologist and the petroleum engineer may have been surprised but not the geographer. And would not corporations with wide flung interests such as the Anaconda Copper Company be benefited by the efforts of a geographer in certain areas of study, research, and planning? Certainly there seems to be no disagreement among professional geographers as to the utility of their discipline; however, the limited employment of geographers in the field of land and resource management, under public and private ownership, indicates that this recognition is not general.

An idea commonly held is that the land and resource management courses in the curriculum of the specific resource schools, approach the subject "land" in its broadest sense. This they cannot do, being specialized, concerned only with their specialty. This is a self-imposed limitation but necessary due to the demands for full

and complete coverage of the resource subject. To the geography department is given the task or opportunity of presenting the overall picture of the "land" not only in the descriptive sense but also the interpretation of that description.

The suggestion is not intended that geography in higher education reorganize and cast aside conventional courses to emphasize land management. However, it is believed that land management will be an ever expanding field for the trained man, especially as the peoples of underdeveloped areas of the world seek to utilize their "land" under wise management. It would seem therefore that certain college geography departments should examine their program in view of expanding into this field. A general criticism that geography is an impractical course of study has often placed college departments in a defensive position regarding this discipline. It is contended that college geography in striving to demonstrate the utility of the field should provide education for specialization in land management as the most logical major step in that direction.

An Opportunity for Geography Departments

A recent investigation of college geography in the United States[1] indicated that of 1,220 institutions reporting on the status of geography, formal course work, given by an instructor under a course title, was offered by 873 institutions. Within these institutions there was a total offering of 152 courses in conservation, 20 in field geography and field problems, 9 soils, 11 land use, 9 advanced conservation of some kind, 1 land planning, 1 geographic planning, 1 resource management problems and 1 regional studies and land planning course.

Certainly the investigation indicates that there is a lack of challenging work opportunities having for an objective leadership training in analytical and dynamic geographic interpretation of land and resources. It would seem that the logical managers of our resources are not being systematically trained in our institutions; that is, it appears that no universities presently offer topical courses in an integrated program that would enable the graduate to fully evaluate conflicting usages (on a regional or unit basis) against a background of present greatest need and fully consider the effect in time. Conservation courses are one of the greatest contributions a geography department may make to general educa-

[1] Schwendeman, J. R., *Directory of College Geography of the United States*, Academic Year 1950-51 (University of Kentucky, Lexington, 1952).

tion, but are too superficial to give the geography major adequate resource training. The ability, considered unique to geographers, of being able to synthesize the findings of other specialists, is not a gift automatically conferred upon the graduate but must be developed by a thoro and broad training, which, it is contended, would be enhanced by a land management program.

PRESENT STATUS OF LAND MANAGEMENT EDUCATION IN COLLEGE GEOGRAPHY

It is believed that a considerable number of geography departments now offering a strong major could establish a curriculum that would lead to a degree in land management. Such a curriculum could also serve to strengthen the general geography program. It is quite reasonable to expect that there would be a demand for a minor in land management by majors in resource fields to whom a wider knowledge of resources in general would be attractive. Resource management, as it involves techniques and specific resources, more properly belongs in other divisions of a university but geography can perform a needed service by providing land management courses open to non-geographers in resource fields.

The land manager must not only be a general geographer but he also needs a background that includes a knowledge of specific resources and the techniques associated with them. He should have schooling in business and public administration, be acquainted with the dissemination of information and have practical experience in as many resource fields as is practical.

The first two requirements strictly limit the number of institutions that could easily commence a land management program. There must be a strong geography department and there must also be a wide variety of resource curricula (such as forestry and agriculture) from which the program could choose, by cooperative agreement, basic courses to build the management curricula. The last requirement, practical experience, would perhaps best be met in a Western institution where summer work opportunities in the varied resource fields are relatively plentiful, but location need not be a critical factor.

THE CONTENT OF LAND MANAGEMENT EDUCATION

The following courses, outside the division of geography, were picked from the catalogue of a state college, as being of sufficient value to be included in land management programming at that particular institution:

Course	*Semester Hours*	
Crop Production	3	
Soils	3	
Irrigation	3	
Farm and Ranch Management	3	
Agricultural Economics	3	
Conservation of Agricultural Resources	3	
Ranch Management	3	
Land Utilization	2	under agriculture
Public Relations	3	under agriculture
General Botany	4	
Animal Ecology	4	
Wildlife Management	3	
Introduction to Economics	3	
Land Economics and Utilization	3	under economics
The American Indian	3	
Physical Geology	4	
Economic Geology	3	
Principles and Methods of Discussion	2	
Economic History of the U.S.	3	
Public Administration	3	
Professional Writing	3	
Total	64	

This list does not include such valuable courses as forest resources, elements of mining, population problems and cultural contact and change (anthropology) as are offered by a neighboring institution. Perhaps these and others, as recreation planning, are equally justified on the basis of a program in geography leading to an advanced degree in land management.

To such a list should be added the conventional geography courses and a field study camp. It may be pertinent to note that the geography department is small at the state college used as an illustration and a management program there would necessitate changes in the geography offerings as such.

In conclusion the following observations are made: Land management education should be given early consideration by geographers as one of the most urgently needed specialties. Within the present general offering at a number of institutions there is a sufficient course resource upon which to build a program of land management. The program would have to be based upon a much tighter scheduling than is common in most geography departments because of the fullness of the program. Lastly, it is held that the proposed program would be beneficial to a wide group of students by expanding the elective list in the field of geography.

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EDITORIAL NOTES AND NEWS

The 27th annual meeting of the New England Geographical Conference was held in New Hampshire with the Geography Department of Dartmouth College as hosts on October 3 and 4. One hundred and four turned out for the weekend combination of local field trip work and an introduction to the Dartmouth Northern Studies Program. At the business meeting presided over by George Rumney of the University of Connecticut, the following officers were elected for 1953-54: President, Trevor Lloyd, Dartmouth College; Vice-President, Herold Wiens, Yale University and Secretary-Treasurer, Minnie Lemaire, Mt. Holyoke College. The State Vice-Presidents are: Connecticut, Joseph B. Hoyt, New Haven State; Maine, Lawrence Goldthwaite, University of Maine; Massachusetts, George K. Lewis, Boston University; New Hampshire, Donald Chapman, University of New Hampshire; Rhode Island, William McIntyre, Lockwood High School; and Vermont, Florence Woodard, University of Vermont.

The number of local chapters in Gamma Theta Upsilon has increased rapidly during the last five years. During 1948-1953 inclusive, 33 chapters have been installed. The chapters are as follows: Sigma, University of Kentucky, Sponsor, Thomas P. Field; Tau, Indiana University, Sponsor, Thomas F. Barton; Upsilon, Bowling Green State University, Sponsor, Lyle R. Fletcher; Phi, Stanford University, Sponsor, C. Langdon White; Chi, Oklahoma Agricultural and Mechanical, Sponsor, Ralph E. Birchard; Psi, University of North Dakota, Sponsor, Bernt Lloyd Wills; Omega, State Teachers College, East Stroudsburg, Pennsylvania, Sponsor, Veva Dean; Alpha Alpha, North Texas State Teachers College, Sponsor, Robert A. Miller; Alpha Beta, Tennessee Agricultural and Industrial, Sponsor, Maize O. Tyson; Alpha Gamma, Western Michigan College of Education, Sponsor, Cyril L. Stout; Alpha Delta, University of Miami, Sponsor, Richard D. Kreske; Alpha Epsilon, University of Utah, Sponsor, Elbert Miller; Alpha Zeta, Teachers College, Columbia, Sponsor, George T. Renner; Alpha Eta, Nebraska State Teachers College, Sponsor, Alvin M. Johnson; Alpha Theta, State College of Washington, Sponsor, Willis B. Merriam; Alpha Iota, University of Oklahoma, Sponsor, Arthur H. Doerr; Alpha Kappa, University of Virginia, Sponsor, Sidman P. Poole; Alpha Lambda, Eastern Tennessee State College, Sponsor, Elwyn L. Martin; Alpha Mu, Milwaukee State Teachers College, Sponsor, Mary Jo Read; Alpha Nu, Kent State University, Sponsor, James R. Beck; Alpha Xi, Valparaiso University, Sponsor, E. J. Buls; Alpha Omicron, Northwestern University, Sponsor, Clyde F. Kohn; Alpha Pi, East Central State College, Oklahoma, Sponsor, Gordon M. Harrel; Alpha Rho, St. Louis University, Sponsor, John W. Conoyer; Alpha Sigma, Clark University, Sponsor, Henry J. Warman; Alpha Tau, Pennsylvania State College, Sponsor, A. L. Rodgers; Alpha Upsilon, Long Beach State College, Sponsor, James W. Wilson; Alpha Phi, University of Nebraska, Sponsor, Esther Anderson; Alpha Chi, Mexico City College, Sponsor, Jorge Vivo-Escoto; Alpha Psi, University of Colorado, Sponsor, Albert W. Smith; Alpha Omega, West Texas State College, Sponsor, M. B. Measamer; Beta Alpha, University of Buffalo, Sponsor, Gabriel P. Betz; Beta Beta, University of Washington, Sponsor, Donald Hudson.

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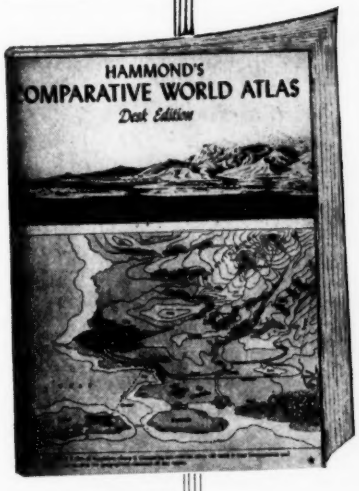

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Sigma Delta Epsilon, Graduate Women's Scientific Fraternity, announces a Predoctoral Fellowship of $1,400. Applications for the year 1954-1955 should be submitted before February 1, 1954, to the Fellowship Board authorized to make the award of the fifth Sigma Delta Epsilon Fellowship. Women with the equivalent of a Master's degree, carrying on research in the mathematical, physical or biological sciences, who need financial assistance to complete work for the doctorate and give evidence of high ability and promise are eligible. During the term of her appointment the appointee must devote the major part of her time to the approved research project, and not engage in other work for remuneration (unless such work shall have recieved the written approval of the board before the award of the fellowship). Dr. Anderson informs me that the fellowship is available to women who are interested in the natural science phases of geography. Application blanks may be secured from D. Esther S. Anderson, Geography Department, University of Nebraska, Lincoln 8, Nebraska. Announcement of the award will be made early in March.

Reprints of the circular entitled "Free Materials and Individual Differences," by Dr. John Guy Fowlkes, will be furnished free to educators who write to Educators Progress, Randolph, Wisconsin.

Have you used any of the books in the American Edition of "The Young Traveler Series" of the E. P. Dutton and Company, New York? *The Young Traveler in Holland; The Young Traveler in France*; *The Young Traveler in Sweden* and *The Young Traveler in England and Wales* have been published. Other books in preparation will deal with China, Canada, South Africa, U. S. A., Australia, New Zealand, India and Pakistan, Switzerland, Ireland, South Seas and Norway.

Do you have a manuscript dealing with the teaching of geography— grades 1 to 3 or 4 to 6. If so, why not revise it and submit it to the editorial offices of the JOURNAL OF GEOGRAPHY.

The twentieth Century Fund releases the following geographic news item: A study of Africa will begin in the fall and is planned to take about three years for completion. George H. T. Kimble has resigned his position as Executive Director of the American Geographical Society to undertake direction of the Fund project. Concentrating on the non-self-governing areas of Africa south of the Sahara and north of the Union of South Africa, Dr. Kimble will cover human and natural resources, economic organization, productive facilities, governments, health, education and so on. The staff will prepare a comprehensive report for the general reader, and plans also call for more specialized treatment of some of the urgent economic and political problems of tropical Africa, including the conservation of natural resources, racialism, colonialism, ideological struggles, productivity, strategic considerations and a number of others.

Word has reached us that Missouri has organized a State Council and that Dr. Sidney Ekblaw is the State Coordinator.

Dr. E. E. Lackey, former president of NCGT and State coordinator is Professor Emeritus and is now Expert Consultant in the Environmental section of the Quartermaster General's office stationed at Natik, Massachusetts.

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Among the 10 top film strips to receive the *Scholastic Teacher* magazine awards for outstanding merit in 1952 are the following film strips useful in the teaching of geography: *The Navajos* (Life Filmstrips); *Petroleum in Today's Living* (American Petroleum Institute); *Then and Now in the United States series* (Silver-Burdett) and *U. S. Regional Geography series* (Young American Films).

Thirty-five graduates from colleges all over the United States and from seven foreign countries attended the annual field camp of the Graduate School of Geography, Clark University, Worcester, held at Loch Haven Camp, Roanoke, Virginia, September 25 thru October 14. Dr. Samuel Van Valkenburg, director of the Graduate School of Geography, was in charge of the field camp. This is the first time in twenty years the field camp was held outside the New England states, Dr. Van Valkenburg said. The geographers will make surveys of the terrain farms, the land use and the urban development of Roanoke in cooperation with the School of Advanced Studies at Princeton University, from whom the Clark Graduate School of Geography received a research grant. The Roanoke Chamber of Commerce and the Virginia Polytechnic Institute department of agricultural engineering staff will cooperate in the study.

In a recent report the failure of city planning to make adequate provision for industry threatens to weaken the economic base of the city, endangering the plans for housing, recreation and other activities.

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International Films Bureau, Incorporated, 57 East Jackson Blvd. Chicago 4, Illinois, recently announced the release of three new films of the "Living Science Series" entitled *Attracting Birds in Winter, Building Bird Houses* and *Cultivate Your Garden Birds.*

The following are editors of Bulletins and Newsletters: Illinois, Mrs. C. C. Colby, Navy Pier of University of Illinois, Chicago; Indiana, Dr. G. David Koch, State Teachers College, Terre Haute; Iowa, Luella Specht, Indianola (May issue), W. G. Richards, Drake University, Des Moines; Kansas, Dr. T. R. Smith, University of Kansas, Lawrence; Minnesota, Dr. Hildegard B. Johnson, Macalester College, St. Paul; Nebraska, Olga Steele, Extension Division, University of Nebraska, Lincoln; New England, Marion I. Wright, Rhode Island College of Education, Providence; New York, Katheryne Thomas Whittemore, State University of New York College for Teachers, Buffalo; North Dakota, Miss Viola M. Bohm, 1028 12th Street, Bismarck; Oklahoma, Gordon E. Schilz, Southeastern State College, Durant; Oregon, Mrs. Hester Quick, Corbett Grade School, Corbett; Pennsylvania, Mrs. Erna G. Gilland, 327 Wood Street, California; and Virginia, Raus M. Hanson, Madison College, Harrisonburg.

Indo-China (Foreign Geography Information Series No. 6) containing 92 pages with maps is available at 50 cents per copy from the Geographical Branch, Department of Mines and Technical Surveys, 74 Elgin Street, Ottawa, Ontario. A discount of 40 per cent is allowed to teachers and bona fide educational institutions. Please make remittance payable to the Receiver-General of Canada.

EDITORIAL NOTES AND NEWS

It is reported that the average adult eats his weight in food every six to eight weeks.

We have received notice that the Department of Geography at the University of Malaya is launching a new periodical to be known as "The Malayan Journal of Tropical Geography." The first number is appearing in October 1953 and thereafter twice a year—in March and October. Its first editor is Mr. Paul Wheatly, M. A. late of University College, London and now with the University of Malaya.

According to a recent report Ireland's total population declined by 3,574,000 between 1841 and 1946. Persons aged 65 and over increased by 115,000. Children up to 14, who constituted more than one-third of the population in 1881, counted up to little more than one-quarter in 1936. Snce 1936, the proportion has risen from 27.6 per cent to 28.9 per cent.

The 1953-1954 officers of the Nebraska Council of Geography Teachers are: President, Leslie Hewes, University of Nebraska, Lincoln; Vice-President, Fred G. Dale, State Teachers College, Wayne; Secretary-Treasurer, Mrs. Arline Korinek, Box 182, Wilber; State Coordinator, Miss Esther S. Anderson, University of Nebraska, Lincoln; and Editor, Mrs. Olga Steele, 2731 South 35 Street, Lincoln.

Do you receive *Road Maps?* If you teach Economic Geography you may receive these charts by writing to National Conference Industrial Board, 247 Park Avenue, New York 7, and by giving them your school address. The *Road Map* charts will be sent to your school address regularly from September to June; mailings are suspended during the summer. Only one copy of each *Road Map* is sent regularly without charge. Extra copies of any current chart are available upon request providing you state the exact number you wish to use and the supply has not been exhausted.

Miss Adelaide Blouch, Lakewood, Ohio, was among more than 60 persons from 16 countries who attended the study course at Schule Schloss Salem, Baden, Germany, from July 28 to August 15. She was one of two delegates representing the United States. Lectures and discussions were in French and English with frequent pauses for translations. There were six group leaders besides the director, Mr. Kenneth Millins of Durham University, England. During the first group sessions they were divided according to age interests, and in the second period the division was on the basis of subject matter interests. She worked out and presented a unit of study on Central America to show the contribution of geography study to promote world citizenship and how other elementary school subjects may be integrated. It was not difficult to do as it seemed to her that geography plays an important role. Miss Blouch is now busy giving speeches and showing slides in public gatherings, carrying the message to American audiences.

Professor Nels A. Bengtson, former president of the NCGT and state coordinator is Professor Emeritus and is now serving as Executive Secretary of the Physics Department, University of Nebraska.

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WEATHER AND MAN

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This text is specifically designed for a general course in weather science. It is suitable for students enrolled in all curricula. You'll find a truly teachable background of weather information. In cases where an explanation would involve a knowledge of physics and mathematics, facts are stated in a purely descriptive manner. Part I is a non-technical treatment of weather elements. Part II discusses the *applications* of weather science to specific fields, such as Health, Agriculture, Business and Industry.

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